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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/573,888

11/13/2006

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EXAMINER

LAM, HUNG Q

ART UNIT

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DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/573,888	Applicant(s) TSUDA, HIROYUKI	
	Examiner Hung Lam	Art Unit 2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>06/28/2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of the Application

Claims 1-7, 9 and 10 are pending in this application.

Claim 8 is preliminary canceled.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on June 28, 2006 filled in compliance with the provisions of 37 CFR 1.97. The examiner is considering the information disclosure statement.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in Application No. 10/573,888, filed on March 29, 2006.

Drawings

The drawings submitted on March 29, 2006 are accepted as part of the formal application.

Specification

The specification is accepted as part of the formal application.

Applicant cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

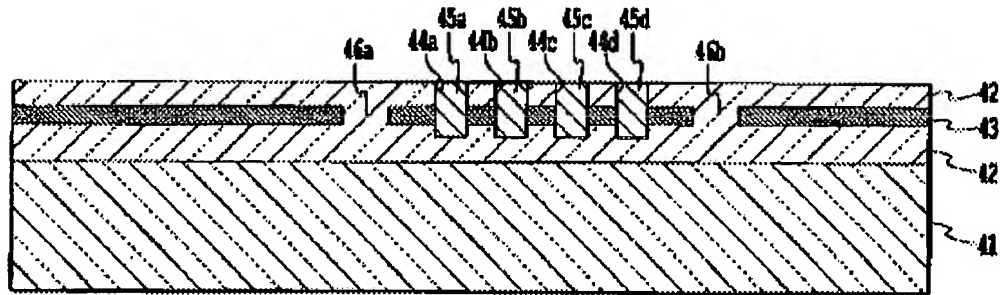
1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-5, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamei et al. (US. Pub. 2004/0126052) and Deacon (US. Pat. 6,373,872) in view of Nilsson et al. (US. Pat. 5,438,637).

Regarding claims 1 and 2, Kamei et al. disclose an optical functional waveguide circuit comprising:

- a cladding layer 42 formed on a substrate 41, a core 43 which is formed in said clad and serves as an optical waveguide/path ([0190], and Fig. 29B);
- a plurality of groove structures 44a-44d formed so as to align at a predetermined interval along the optical waveguide/path 43 and fragmentize the optical waveguide/path 43 and being filled with a material having a refractive index temperature coefficient different from that said core 43([0189], [0192], Fig. 29B).

FIG.29B



Reproduced from US. Pub. 2004/0126052.

Kamei et al. only disclose that filled material in the grooves is effected by heat (temperature), **Kamei et al.**, however, do not explicitly disclose a heater or a heater electrode interposed between said plurality of groove structures provided along the optical path.

Deacon teaches a thermo-optically tuned grating reflector having an intracavity grating waveguide structure 122 wherein the material in a grating region/segment 130 of the intracavity waveguide 122 have a substantial thermal coefficient that is controlled by a strip pattern heater trace/electrode 160. The heater trace/electrode 160 may have other patterns known in the art such as photo resist patterns or serpentine/snake patterns that disposed over the grating region 130 of the intracavity waveguide 122 (col. 15 lines 2-4 and 32-35).

Nilsson et al. teach an electrically controllable filter device having a fragmented optical waveguide 2' with plurality of periodic groove structures 4' that filled with a semi-conducting material or oxide wherein an electrode structure A, B is interposed between said plurality of groove structures 4' provided along the fragmented optical waveguide 2' (col. 4 lines 20-40, and Fig. 3b).

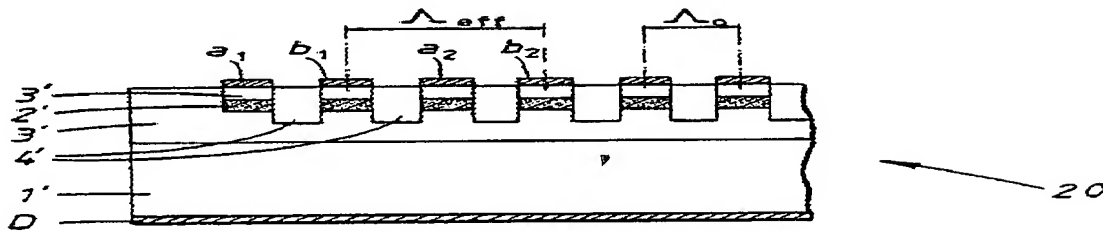


FIG. 3b

Reproduced from US. Pat. 5,438,637.

It would have been obvious to the one having ordinary skill in the art at the time the invention was made to use the teachings of **Deacon** to modify **Kamei et al.** by including the heater's electrode patterns over along the groove structures of the optical path. The motivation for doing so is for providing heater source with heater electrode arrangement to the groove structures since this heater traces comprising an electrode arrangement that easy to modify and "have low resistance to reduce unwanted power consumption" (Deacon, col. 16 lines 1-5).

Moreover, it would have been obvious to the one having ordinary skill in the art at the time the invention was made to use the teachings of **Nilsson et al.** to modify **Kamei et al.** and **Deacon** by rearrange the serpentine (snake or photo resist patterns) heater electrode patterns that being interposed between said pluralities of groove structures provided along the optical path. The motivation for doing so is for optimized the temperature distribution fast and effectively to each individual groove in the groove structures, since this electrode structure "is simple and cheap to fabricate" plus such "a device with a great flexibility and which can be varied in a number of different ways" (Nilsson et al, col. 2 lines 1-10).

Regarding claims 2 and 3, in accordance with the rejection of claim 1, **Kamei et al.** and **Deacon** modified by **Nilsson et al.** further disclose that pluralities of groove structures are lens-

shaped, therefore, at least one of the end faces of said pluralities of groove structures is tilted from a position perpendicular to the optical path (Deacon, Fig. 40)

Regarding claims 4 and 5, Kamei et al. and Deacon modified by **Nilsson et al.** further disclose that an optical modulator comprising the optical functional waveguide according to claim 1 which modulates the phase of light since “the grating interaction may be changed by a distributed thermally induced phase shift as a function of the heater current” (col. 12 lines 8-18 and col. 16 lines 13-15); and an arrayed waveguide grating 552 comprising the optical functional waveguide according to claim 2 in a slab waveguide 553 (Kamei et al, [0316], and Fig. 42).

Regarding claim 9, in accordance with the rejection of claim 1, **Kamei et al. and Deacon** modified by **Nilsson et al.** further disclose that groove structure 418a-n is provided at a slab waveguide of a coupling portion of the slab waveguide 413a and a single mode waveguide 414a (Kamei et al, [0291]-[0294], and Fig. 39-40).

Regarding claim 10, in accordance with the rejection of claim 1, **Kamei et al. and Deacon** modified by **Nilsson et al.** further disclose that pluralities of groove structures are wedge-shaped (Deacon, Fig. 32).

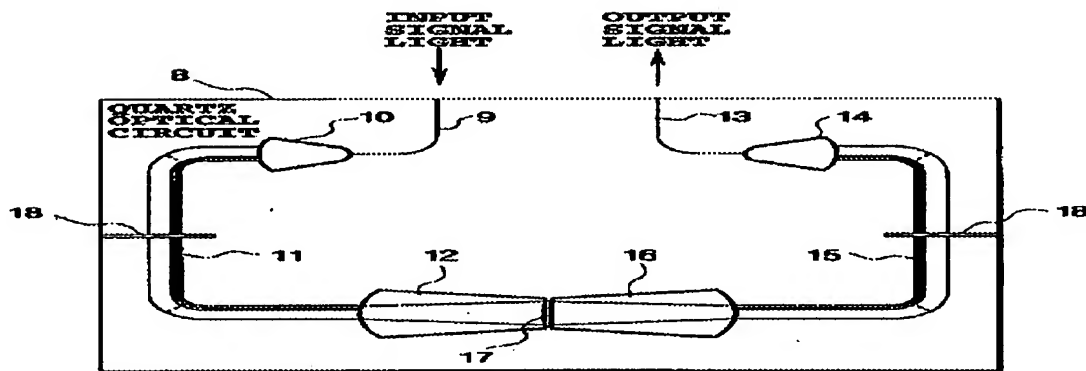
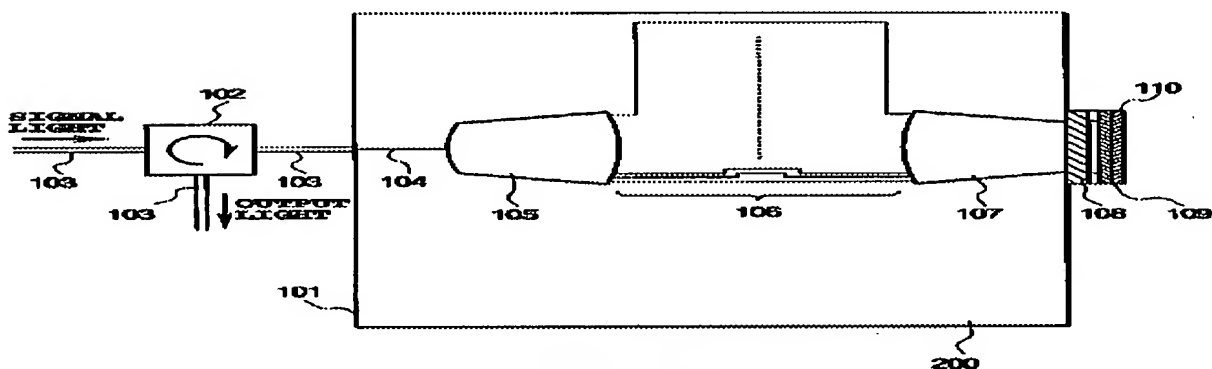
Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kamei et al. and Deacon** modified by **Nilsson et al.** and further in the view of **Kurokawa et al.** (US. Pat. 6,122,419).

Regarding claims 6 and 7, in accordance with the rejection of claim 2, **Kamei et al. and Deacon** modified by **Nilsson et al.** further disclose the claimed invention except for a dispersion compensation circuit comprising the optical functional waveguide according to claim 2 in the vicinity of a coupling portion that two arrayed waveguide gratings are coupled to each other in a

Art Unit: 2883

cascade, and a mirror provided in a waveguide and arranged in the vicinity of a spectrum plane wherein the optical functional waveguide according arranged in the vicinity of said mirror.

Kurokawa et al. teach a dispersion compensation circuit comprising mirror 110 attached to waveguide of slab waveguide 107 of arrayed waveguide grating 200 and arranged in the vicinity of a plane that produce reflecting spectrum where the slab waveguide 107 is attached to that vicinity (col. 24 lines 32-45, col. 30 lines 2-3, and Fig. 20); and **Kurokawa et al** also disclose a coupling portion 17 a rewritable pattern glass substrate that two array waveguide grating 11 and 15 are coupled to each other in series (col. 21 lines 1-28, and Fig. 10).

**FIG. 10****FIG. 20**

Reproduced from US. Pat. 6,122,419.

It would have been obvious to the one having ordinary skill in the art at the time the invention was made to combine these teachings above of **Kurokawa et al.** and using them to modify the device of **Kamei et al.** and **Deacon** modified by **Nilsson et al.** by incorporating the optical functional waveguide to a coupling portion of a dispersion compensation circuit that enable two arrayed waveguide gratings are coupled in series, and further also including a mirror which is provided in a waveguide of the optical functional waveguide that arrange in the vicinity of a plane that produces the reflection spectrum. The motivation for doing so is “to distribute the incident light on a straight line and making desired amplitude or phase modulation of the light according to the position on the straight line and reflecting the light” and it is possible to control the dispersion compensation amount of a requirement (Kurokawa et al. “Abstract”, col. 3 lines 6-9).

Cited Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Dragone et al. (US. Pat. 6,263,127).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Lam whose telephone number is 571-272-9790. The examiner can normally be reached on M - F 07:30 AM - 05:00 PM.

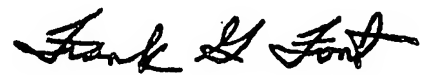
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2883

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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